

Undergraduate EFL Learners' Use and Acceptance of Mobile-Assisted Language Learning: A Structural Equation Modeling Approach

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Abstract

Mobile-assisted language learning has received growing attention from the technology industry through the proliferation of mobile learning platforms and applications. The literature has promoted the potential effectiveness of such platforms. However, little attention has been given to learners' use behavior and perceptions, which play an essential role in successful implementation. In addition, research is scarce on the acceptance and use of MALL to learn English in Middle Eastern countries. The Unified Theory of Acceptance and Use of Technology 2 was employed in this study to examine the main factors affecting the acceptance and use of MALL among 945 undergraduate EFL learners in Saudi Arabia. The findings demonstrated that the constructs of habit, performance expectancy, facilitating conditions, hedonic motivation, and social influence were significant indicators of EFL learners' behavioral intention to use MALL. Out of habit, behavioral intention, and facilitating conditions, habit was the only construct with a significant impact on participants' use behavior.

Keywords: mobile learning, MALL, UTAUT2, EFL, Technology acceptance

1. Introduction

Mobile devices have become central to everyday life in developed and developing nations alike (Hao et al., 2017; Hoi, 2020; Kaliisa et al., 2019), providing various mobile learning options for education (Hoi, 2020; Ke & Hsu, 2015; Kukulska-Hulme et al., 2017). Mobile learning here refers to learning that takes place through the medium of mobile devices (Althunibat, 2015). Mobile applications and platforms have increasingly supported language learning (Godwin-Jones, 2011; Heil et al., 2016; Morgana, 2019; Stanley, 2013; Tommerdahl et al., 2022).

The effective implementation of mobile devices in education depends heavily on learners' perceptions and preferences (Lai & Zheng, 2018; Teo et al., 2019). Al-Adwan et al. (2018), for instance, asserted that students' acceptance and intention to use mobile devices for educational purposes could determine the success of mobile learning. This behavioral intention can be influenced by a range of factors (Nikolopoulou et al., 2020), including psychological and cultural factors, such as students' personalities and learning styles (Ameri et al., 2020; Hao et al., 2017), as well as affordability (Beres, 2011; Hao et al., 2017). Furthermore, while researchers and teachers might see mobile learning's potential benefits, "it is not always clear whether students share these views" (Beres, 2011, p. 96). Thus, there has been a growing call to understand learners' behavior and attitudes toward mobile learning (Altalhi, 2021; Ameri et al., 2020; Hao et al., 2017; Kumar & Bervell, 2019).

Mobile-assisted language learning (MALL) is "the use of smartphones and other mobile technologies in language learning, especially in situations where portability and situated learning offer specific advantages" (Kukulska-Hulme, 2020, p. 1), and has been widely promoted in the literature (e.g., Chuang, 2017; Gangaiamaran & Pasupathi, 2017). Some researchers and educators have explored the state of language learning applications (e.g., Gangaiamaran & Pasupathi, 2017; Godwin-Jones, 2011) while others have advocated for integrating mobile devices into pedagogy (e.g., Daly, 2022; Rockey et al., 2020) because of their potential to facilitate life-long learning and learner autonomy (Godwin-Jones, 2017). Mobile devices have also been considered effective tools in developing vocabulary (e.g., Honarзад & Soyooof, 2023; Kara, 2022; Li & Cummins, 2019; Li & Hafner, 2022; van Lieshout & Cardoso, 2022), speaking skills (e.g., Le & Nguyen, 2021; Sun et al., 2017), pronunciation (e.g., Fithriani, 2021; Fouz-González, 2020), writing skills (e.g., Andujar, 2016; Wang & Jiang, 2021), and dynamic assessment (Rassaei, 2021). However, relatively little research work has been done to examine learners' acceptance of mobile devices in language learning, even though it is important to explore and consider learner perspectives before implementing MALL (Botero et al., 2018; Hoang et al., 2022; Hoi, 2020; Luo & Watts, 2022). For example, Chwo et al. (2018) examined 213 studies and found "significant discrepancies between how teachers and instructional designers expect MALL devices to be used and how the students actually use them" (p. 62).

For the above reasons, recent studies have started to consider learners' acceptance and use of MALL (e.g., Alhadiah, 2020; Hoi, 2020; Lai

et al., 2018; Lai & Zheng, 2018; Loewen et al., 2019; Luo & Watts, 2022; Puebla et al., 2022; Tong et al., 2022; Zhang & Pérez-Paredes, 2019). For example, Lai et al. (2018) and Lai and Zheng (2018) explored the learning experiences of undergraduate students in Hong Kong using technology for foreign language learning. Zhang and Pérez-Paredes (2019) investigated the uses and motivations behind Chinese EFL learners' choices of MALL resources, while the use and acceptance of MALL among Vietnamese higher education students were examined in Hoi (2020), who highlighted the importance of learners' attitudes and performance expectancy in forming behavioral intention to use such technology. Tong et al. (2022) examined the usage of a mobile social networking platform (WeChat) to learn a foreign language (Chinese) at an Australian university. They found that students' engagement improved over time and students achieved more authentic use of the target language. Exploring 10 Chinese students' lived experience of learning English with the help of MALL, Luo and Watts (2022) revealed positive perceptions of MALL with a preference for informal learning. Alhadiah (2020) likewise reported that EFL Saudi students showed positive attitudes toward using a MALL-based vocabulary learning tool. Puebla et al. (2022) claimed that most research had focused on children and young adults; therefore, they examined older adults (aged 60+) in Germany. Their participants showed a reluctance to fully adopt MALL in language learning.

Overall, the outcomes of the few existing research studies on learners' use and acceptance of MALL cannot be generalized because they have been carried out in diverse contexts (Botero et al., 2018) and have differed in the explanatory power of the model used (Thomas et al., 2013). Furthermore, very few studies have examined learners' acceptance of MALL in the context of English as a foreign language (EFL) in developing countries (Hoi, 2020), especially Middle Eastern countries. Saudi Arabia in particular is likely to reveal fruitful findings in this regard as 93.5% of the Saudi population own smartphones, and 99% of these owners access the Internet through their mobile phones (Communications and Information Technology Commission, 2019). In addition, the majority of MALL studies have explored the institutional usage of MALL, with less attention given to informal and instrumental use (Burston & Giannakou, 2021; Godwin-Jones, 2017; Tong et al., 2022), where learners' choices are likely to be more obvious.

To help address this gap in the literature, the present study employed the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) to examine the acceptance and informal use of MALL among Saudi undergraduate EFL students learning English for academic purposes. This could shed light on major factors affecting EFL learners' behavior and thereby inform EFL educators and mobile learning platform designers. Furthermore, employing the UTAUT2 in this new context could contribute to the literature on mobile learning acceptance in general and MALL acceptance in particular. Finally, in response to the need to consider the multivariate nature of MALL in research (Hou & Aryadoust, 2021), this study employed structural equation modeling.

2. Literature Review

The end user's acceptance and adoption of technology has garnered considerable attention from practitioners and researchers (Dwivedi et al., 2019; Dwivedi et al., 2020; Venkatesh et al., 2012). As a result, several models and theories have been proposed to understand the factors involved, portray the relationships between these factors, and identify how they can impact the intention to utilize technology. The most common models, as reviewed in Venkatesh et al. (2003), have been the "Theory of Reasoned Action" (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the "Model of PC Utilization" (Triandis, 1977), "Social Cognitive Theory" (Bandura, 1986), the "Technology Acceptance Model" (Davis, 1989), the "Theory of Planned Behavior" (Ajzen, 1991), the "Motivational Model" (Davis et al., 1992), the "Innovation Diffusion Theory" (Rogers, 1995), and "the combined Technology Acceptance Model and Theory of Planned Behavior" (Taylor & Todd, 1995). Dwivedi et al. (2019) argued that these models and theories explained the use and acceptance of technology differently because they built their explanations on different contextual and technological factors. For that reason, Venkatesh et al. (2003) comprehensively reviewed these prominent models and the literature on user acceptance to formulate the UTAUT, incorporating common elements into a unified model.

According to Venkatesh et al. (2003), such a synthesis amplified the explanatory power of UTAUT and allowed for theorizing relationships between psychological and social variables in the use and acceptance of technology. The original UTAUT consisted of four main constructs (i.e., performance expectancy, effort expectancy, social influence, and facilitating conditions) that were believed to have an impact on technology acceptance and use (Venkatesh et al., 2003). Furthermore, these constructs were posited to be moderated by voluntariness, experience, gender, and age. Venkatesh et al. (2012) later suggested UTAUT2, which extended the generalizability of the original model from an organizational context to the consumer context by integrating three additional constructs, namely hedonic motivation, habit, and price value.

Both versions of the model have been used extensively in studies attempting to explain acceptance and use of information technology (Dwivedi et al., 2019; Tamilmani, 2021). For instance, they have been used to examine the acceptance of mobile commerce (Shaw & Sergueeva, 2019), mobile healthcare (Dwivedi et al., 2016), and mobile banking (Gupta et al., 2020). The same is true of learner acceptance of mobile learning in higher education (e.g., Al-Adwan et al., 2018; Arain et al., 2019), the utilization of Google Classroom platform in higher education (Kumar & Bervell, 2019), the use of an application by pharmacy students (Ameri et al., 2020), the use of podcasts in education (Lin et al., 2013), teacher perspectives on such technology in education (Šumak & Šorgo, 2016), and the use of mobile technology for language learning (Botero et al., 2018; Hoi, 2020; Tan, 2013).

Although UTAUT has been reported widely in the literature on mobile learning acceptance and has established credibility (Nikolopoulou et al., 2020), the use of UTAUT2 has been limited in higher education (Arain et al., 2019; Nikolopoulou et al., 2020). In addition, Venkatesh et al. (2012) encouraged researchers to contribute to the model by examining it in new settings, such as new technology and new users from

different cultures.

3. Theoretical Framework and Hypotheses

The present study utilized the UTAUT2 (Venkatesh et al., 2012) as a theoretical foundation for several reasons. First, UTAUT2 was tailored to the consumer context, rather than an organizational context, incorporating seven constructs that have a direct impact on user behavioral intention (BI) to use technology in consumer contexts. These main constructs are performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), hedonic motivation (HM), price value (PV), and habit (HT), which are all described in detail below. In addition, the model theorizes that actual use behavior (USE) in consumer contexts can be determined by behavioral intention, facilitating conditions, and habit. Venkatesh et al. (2012) also proposed that the individual difference variables (experience, gender, and age) moderated the relationships between the constructs and behavioral intention as well as actual use behavior. Venkatesh et al. (2016) found that “UTAUT2 explained 74 percent of the variance in consumers’ behavioral intention to use a technology and 52 percent of the variance in consumers’ technology use” (p. 229). Since all constructs in this model were applicable to MALL in EFL learning, it was considered a suitable theoretical framework to achieve the purposes of the present study.

The following description of the constructs is derived from the proposals for UTAUT in Venkatesh et al. (2003) and UTAUT2 in Venkatesh et al. (2012). Performance expectancy is the degree to which a consumer believes that using a technology can improve their performance, while effort expectancy is the degree of ease a consumer finds while using a technology. Social influence is the degree to which the consumer’s use of technology is influenced by others, such as friends and family. Facilitating conditions refers to a consumer’s belief in the availability of needed resources and support to use a technology. Hedonic motivation refers to the enjoyment and pleasure a consumer feels when using the technology (Venkatesh et al., 2003), while price value is the consumer perception of the balance between the cost and benefit of using a technology (Dodds et al., 1991). Habit is the degree to which a consumer can automatically use a technology to learn (Limayem et al., 2007). Behavioral intention is the consumer’s intention to use and continue using a technology in learning, while use behavior is the extent to which a consumer actually uses the technology in learning (Nikolopoulou et al., 2020).

To tailor this model to a MALL context, the definitions of the UTAUT2 were modified. In the context of MALL, performance expectancy refers to the degree to which EFL learners believe that their performance in language learning is improved by using mobile devices, effort expectancy refers to their perceptions of the convenience of using mobile learning for language learning, and social influence is the extent to which parents, peers, and important individuals can influence EFL learners’ intention to use MALL. Facilitating conditions refers to EFL learners’ perception of the technical support available for using mobile devices in language learning, hedonic motivation is the degree to which EFL learners enjoy utilizing mobile devices in language learning, and price value refers to EFL learners’ cognitive comparison between perceived benefits of using mobile devices for language learning and the cost of using them. The habit construct is the extent to which MALL platforms are used automatically by EFL learners, behavioral intention is the extent to which EFL learners intend to use and continue using MALL, and use behavior is the actual use of MALL by EFL learners.

It has been theorized that performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit influence the behavioral intention to use technology, while behavioral intention, habit, and facilitating conditions determine actual use behavior; the integration of habit into UTAUT demonstrates the model’s focus on intentionality as a key underlying driver of consumer behavior (Venkatesh et al., 2012). Furthermore, while behavioral intention has been theorized as the mediating variable, actual use behavior is the dependent variable (Venkatesh et al., 2012). The UTAUT2 proposal is demonstrated in Figure 1 (Venkatesh et al., 2003; Venkatesh et al., 2012).

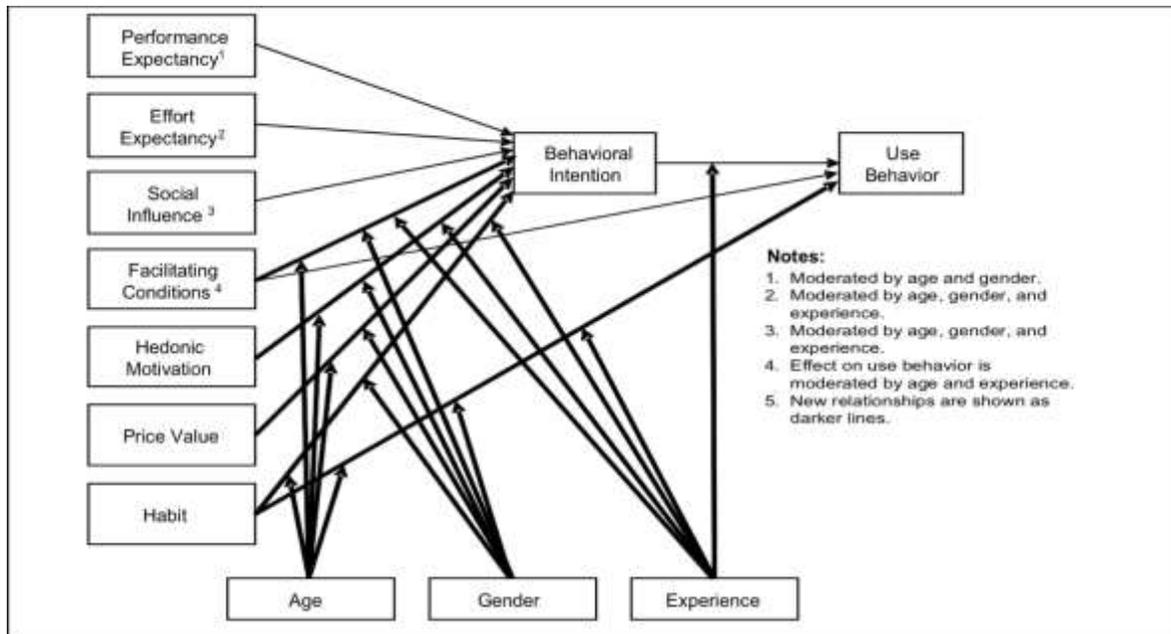


Figure 1. The UTAUT2 Model (Venkatesh et al., 2012)

Based on this model, the following hypotheses were formulated and tested:

1. "PE has a positive influence on EFL learners' BI to use MALL.
2. EE has a positive influence on EFL learners' BI to use MALL.
3. SI has a positive influence on EFL learners' BI to use MALL.
4. FC has a positive influence on EFL learners' BI to use MALL.
5. HM has a positive influence on EFL learners' BI to use MALL.
6. PV has a positive influence on EFL learners' BI to use MALL.
7. HT has a positive influence on EFL learners' BI to use MALL.
8. BI has a positive influence on EFL learners' USE of MALL.
9. FC has a positive influence on EFL learners' USE of MALL.
10. HT has a positive influence on EFL learners' USE of MALL.
11. Gender and experience moderate the influence of PE, EE, SI, FC, HM, PV, and HT on EFL learners' BI to use MALL.
12. Gender and experience moderate the influence of FC and HT on EFL learners' USE of MALL.
13. Gender moderates the influence of PV on EFL learners' BI to use MALL.
14. Experience moderates the influence of BI on EFL learners' USE of MALL."

Age, one of the moderating variables in the model, was excluded from this study because of age homogeneity in the sample, which ranged from 18 to 20.

4. Methods

Instrument

To understand the EFL learners' acceptance of MALL, a UTAUT2 questionnaire consisting of 32 items was administered to 945 EFL learners. The questionnaire comprised three sections. The first section elicited demographic data (i.e., age and gender) and their experience using MALL. The second section asked participants to report their actual usage of mobile devices in language learning through a frequency scale ranging from "never" to "at least once daily." The third section consisted of 28 items derived from related literature (e.g., Botero et al., 2018; Hoi, 2020; Venkatesh et al., 2003; Venkatesh et al., 2012) and reflected the main constructs of the model: four items for performance expectancy, four for effort expectancy, three for social influence, four for facilitating conditions, three for hedonic motivation, three for price value, four for habit, and three items for behavioral intention. With the help of two applied linguists, all items were written initially in English and then translated into participants' native language, Arabic, to ensure their full comprehension of the items. The participants were asked to rate their agreement with the 28 items on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The items in the questionnaire were distributed randomly to decrease the possibility of bias in the responses. Google Forms was used to design

and distribute the questionnaire. To increase validity, 19 students representing the target population participated in a pilot study of the questionnaire.

Participants and Procedures

The population consisted of 945 first-year EFL undergraduate students enrolled in a one-year foundation program to improve their English skills before they could pursue their studies in programs with English as a medium of instruction. The main focus of the program was on core language skills (reading, writing, listening, and speaking) and English for academic purposes. The program also taught some basic sciences in English to facilitate the transition from an Arabic medium of instruction in high school to an English medium of instruction.

With the help of the program director, a link to the online questionnaire, a consent form, and instructions were sent to an email list of students to invite them to voluntarily and anonymously participate in the questionnaire. Out of 4,500 emails sent, 945 complete responses were submitted (21% of the population). The sample was composed of 459 male students (48.6%) and 486 female students (51.4%), with an average age of 19.

Data Analysis

The study employed partial least squares structural equation modeling (PLS-SEM) to test the hypotheses using SmartPLS software (Ringle et al., 2015). PLS-SEM is useful when the objective of the study is predicting the outcomes and when the normality of the data is not satisfied (Hair et al., 2019). More specifically, “PLS-SEM is a useful approach to estimating structural models in L2 [second language] and education research” (Hair & Alamer, 2022, p. 11). PLS-SEM takes another approach to evaluate the model compared to the commonly applied covariance-based SEM (CB-SEM). Two indices are used to establish the appropriateness of the structural model: explanatory power using the R^2 value and predictive relevance using the Q^2 value (Hair et al., 2017). To evaluate the reliability of the measures involved in the model, Cronbach’s alpha (α) and composite reliability were considered. Research suggests that their values should be higher than .70 to indicate reliable constructs (Hair et al., 2019). Similarly, two types of validity were assessed: convergent and discriminant validity. The former is supported by obtaining values above .50 on average variance extracted (AVE). The latter is achieved by showing that constructs’ scores are unique by means of the heterotrait–monotrait (HTMT) ratio of correlations. The suggested value must be less than .90 to support discriminant validity (Hair et al., 2017). Before running the structural model, a test of collinearity was conducted through a variance inflation factor (VIF), with values below 5 (and ideally below 3) indicating no critical issues in the path of the model. The beta (β) coefficients were used as effect sizes following Cohen et al.’s (2011) guidelines: β values between 0 and .10 meant weak effect sizes, .10–.30 (modest), .30–.50 (moderate), and $>.50$ (strong).

5. Results

Before executing the hypothesized model, the normality of the data was assessed. Several variables failed to meet the +1/-1 guidelines in skewness and kurtosis (Hair et al., 2017), thus justifying the use of PLS-SEM. Spearman’s (ρ) correlation (see Table 1) was used to correct for the departure of normality. Other indices, such as mean and standard deviation, are also presented.

Table 1. Correlation Matrix, Mean, and SD

	1	2	3	4	5	6	7	8	9	10
1 using mobile	M=3.83 SD=1.15									
2 Experience (binary)	0.26 ***	—								
3 PE	0.30 ***	0.28 ***	M=4.24 SD=.72							
4 EE	0.27 ***	0.25 ***	0.62 ***	M=4.11 SD=.73						
5 SI	0.19 ***	0.13 ***	0.35 ***	0.37 ***	M=3.54 SD=.98					
6 FC	0.22 ***	0.20 ***	0.50 ***	0.61 ***	0.42 ***	M=4.10 SD=.67				
7 HM	0.28 ***	0.24 ***	0.57 ***	0.58 ***	0.34 ***	0.58 ***	M=4.19 SD=.82			
8 PV	0.13 ***	0.16 ***	0.31 ***	0.37 ***	0.27 ***	0.40 ***	0.30 ***	M=3.46 SD=.96		
9 HT	0.43 ***	0.30 ***	0.53 ***	0.50 ***	0.47 ***	0.57 ***	0.53 ***	0.46 ***	M=3.68 SD=.91	
10 BI	0.32 ***	0.27 ***	0.59 ***	0.53 ***	0.44 ***	0.60 ***	0.56 ***	0.40 ***	0.74 ***	M=4.02 SD=.84

Note. *** $p < .001$ (PE = performance expectancy, EE = effort expectancy, SI = social influence, FC = facilitating conditions, HM = hedonic motivation, PV = price value, HT = habit, BI = behavioral intention).

Main Analysis

Before inspecting the structural model, it was necessary to establish the reliability and validity of the measures. The results demonstrated that all constructs showed values above .75 in both Cronbach’s alpha (α) and composite reliability. All AVE values ranged from .57 to .81, displaying good convergent validity. With the exception of one instant (i.e., habit with behavioral intention), the HTMT results illustrated that all values were below the cut-off of .90, thus supporting discriminant validity. The HTMT between habit and behavioral intention had just approached the cut-off value (HTMT = .905) and so did not show a substantial similarity between the two constructs. The VIF values were far below 3, displaying no issues of collinearity in the structural model. Figure 2 shows that the results of the structural model were meaningful in predicting the outcomes; the R^2 value (.14) was relatively medium, as was predictive relevance ($Q^2 = .13$). As such, the model was free from statistical issues, and its results could be interpreted.

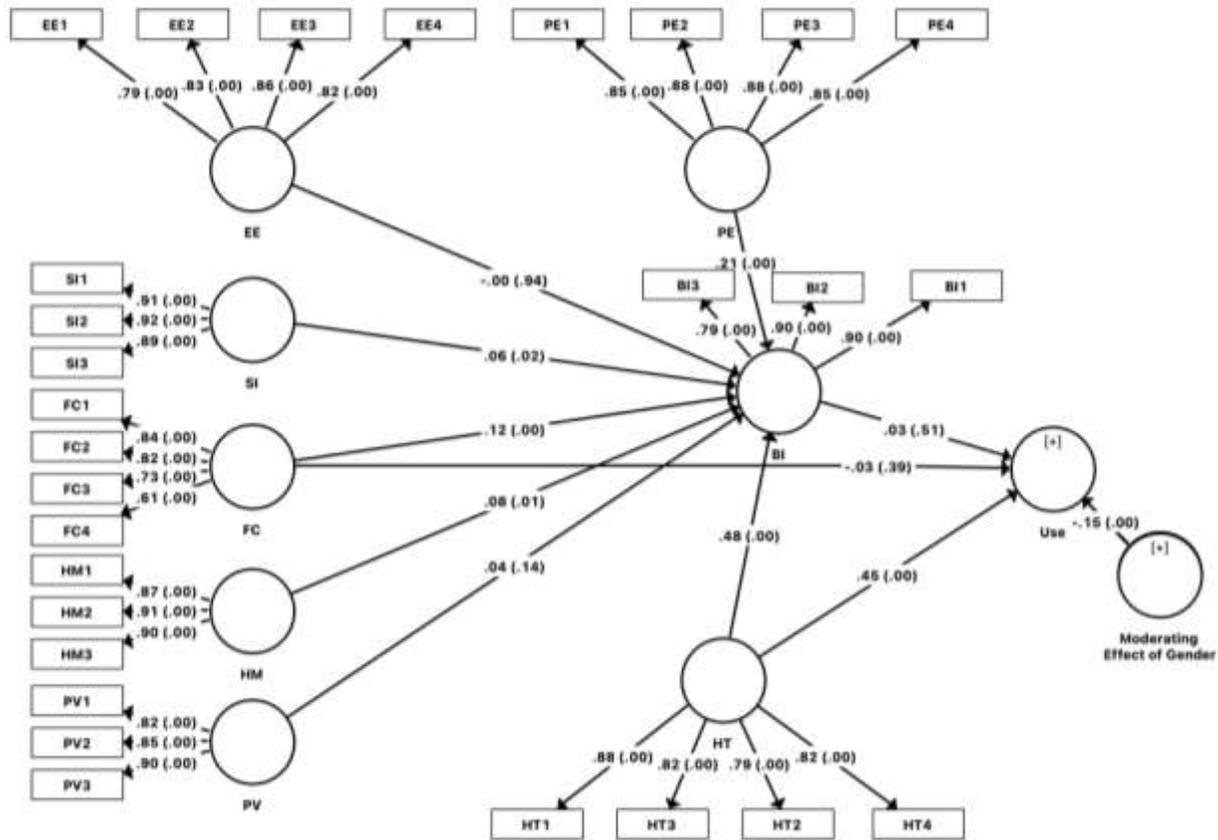


Figure 2. The Results of the Hypothesized Model

Note. p-values are shown in brackets and preceded by beta (β) coefficients. PE = performance expectancy, EE = effort expectancy, SI = social influence, FC = facilitating conditions, HM = hedonic motivation, PV = price value, HT = habit, BI = behavioral intention, USE = use behavior.

As illustrated in Figure 2, only two of the seven hypothesized predictors failed to predict EFL learners’ behavioral intention to use MALL: effort expectancy ($\beta = 0.00, p = .94$) and price value ($\beta = .04, p = .14$). The rest appeared to have a positive significant effect. Of these, habit was the strongest predictor ($\beta = .48, p < .01$), which was large in size, followed by performance expectancy ($\beta = .21, p < .01$) with a medium effect size, and facilitating conditions ($\beta = .12, p < .01$) with a relatively small effect size. Hedonic motivation ($\beta = .08, p = .01$) and social influence ($\beta = .06, p = .02$) also predicted learners’ behavioral intention to use MALL significantly, but with a small effect size.

These findings supported five hypotheses about predictors of behavioral intention to use MALL and rejected two. The results supported Hypothesis 7 as the increased habitual use of MALL was found to have the most powerful influence on EFL learners’ intention to use it more. Hypothesis 1 was also supported by a significant correlation between EFL learners’ MALL performance expectancy and behavioral intention. Learners’ behavioral intention to use MALL was influenced by their social environment and facilitating conditions, which supported Hypotheses 3 and 4. Finally, the significant impact of hedonic motivation on behavioral intention supported Hypothesis 5. However, the findings rejected the hypotheses that effort expectancy and price value would have a positive effect on behavioral intention.

Regarding the three hypothesized determinants of EFL learners’ actual use of MALL, the analysis revealed that habit was the only one that had a significant effect with a large effect size ($\beta = .45, p < .01$). The other two, behavioral intention ($\beta = .03, p = .51$) and facilitating conditions ($\beta = -.03, p = .39$), failed to show a significant effect. Inspection of the indirect effects illustrated that learners’ behavioral

intention to use MALL did not mediate the effect from any predictor variable. In sum, while the analysis supported Hypothesis 10, it rejected Hypotheses 8 and 9.

Moderation Analysis

After establishing the quality of the structural model, a series of moderation analyses were conducted to evaluate the possible interaction effect that gender and experience could have on Hypotheses 11–14. Gender had a moderating effect between behavioral intention and MALL use (interaction effect $\beta = -.15$, $p < .01$), indicating that being male (coded 1, with female coded 2) strengthened the effect of behavioral intention on MALL use. No other interaction effects for gender were found in the rest of the hypotheses. With regard to experience, no interaction effect was observed in the hypothesized relationships. Thus, Hypotheses 11–14 were not supported.

6. Discussion and Implications

The main goal of this study was to examine the acceptance and use of MALL among undergraduate EFL learners and to empirically examine the UTAUT2 in that context. As discussed above, the model proposed that seven constructs have a direct impact on users' behavioral intention to use technology and that actual use of technology can be determined by users' behavioral intention, facilitating conditions, and habit.

The SEM analysis showed that undergraduate EFL students' behavioral intention to use and accept MALL was directly and significantly affected by five factors, namely performance expectancy, social influence, facilitating conditions, hedonic motivation, and habit, but not effort expectancy or price value. A number of conclusions could be drawn from these findings. First of all, habitual use of MALL was the strongest indicator of EFL learners' intention to use it, supporting the argument of Arain et al. (2019), Ameri et al. (2020), Nikolopoulou et al. (2020), and Kumar and Bervell (2019) that examining usage habits can help assess the potential of a mobile learning platform.

Second, in agreement with the literature in various contexts (e.g., Ameri et al., 2020; Arain et al., 2019; El-Masri & Tarhini, 2017; Hoi, 2020; Kumar & Bervell, 2019; Nikolopoulou et al., 2020; Venkatesh et al., 2012), the current study demonstrated the influence of perceived performance expectancy on learners' behavioral intention to use MALL. Therefore, MALL developers should consider the usefulness of their platforms so that they will be embraced by end users.

Third, this study found that social environment had an impact on learners' behavioral intention to use MALL, in agreement with Al-Adwan et al. (2018), Botero et al. (2018), El-Masri and Tarhini (2017), Nikolopoulou et al. (2020), Ameri et al. (2020), and Hoi (2020). This was to be expected since learners do not make decisions about mobile learning in isolation (Al-Adwan et al., 2018), with culture influencing MALL acceptance (Luo & Watts, 2022). This suggests that efforts made to persuade learners to adopt MALL should not focus on learners alone but should extend to other influential people in society.

Fourth, the results imply that providing active technical support, developing off-line tools, and enhancing the compatibility of MALL with other technology can increase EFL learners' intention to use MALL. Therefore, the MALL industry should take facilitating conditions into consideration to encourage learners to form positive behavioral intentions. Botero et al. (2018), Hoi (2020), and Altalhi (2021) similarly found that facilitating conditions played a major role in shaping learner intention to use technology.

Fifth, EFL learners' behavioral intention to use MALL was significantly impacted by hedonic motivation, in agreement with previous studies (e.g., Arain et al., 2019; El-Masri & Tarhini, 2017; Kumar & Bervell, 2019; Nikolopoulou et al., 2020). It could be inferred that the more enjoyable MALL is, the more likely learners will seek to use it.

The construct of effort expectancy was not a significant direct predictor of EFL learners' behavioral intention to use MALL, in keeping with earlier work (e.g., Altalhi, 2021; Ameri et al., 2020; Arain et al., 2019; Botero et al., 2018; Hoi, 2020; Kumar & Bervell, 2019; Nikolopoulou et al., 2020). Price value was not a direct determiner of EFL learners' behavioral intention either, in agreement with El-Masri and Tarhini (2017) and Nikolopoulou et al. (2020). Therefore, it could be inferred that EFL learner's perceptions of MALL platforms' ease of use and pricing do not always influence their intention to use those platforms.

With regard to the hypothesis that EFL learners' actual use of MALL would be determined by three constructs (behavioral intention, facilitating conditions, and habit), the analysis revealed that habit was the only one with significant results. This finding mirrors Kumar and Bervell's (2019) work, where habit was the most important predictor of students' actual use of Google Classroom, in contrast to behavioral intention or facilitating conditions. Behavioral intention's lack of apparent influence on use behavior might be attributed to the inclusion of "habit" in UTAUT2. Kumar and Bervell (2019) empirically demonstrated that including that construct in the model eliminated behavioral intention's influence on use behavior. Furthermore, habit as a predictor of actual use in UTAUT2 has not been sufficiently examined in the literature in a variety of contexts. Thus, based on the results of this study and Kumar and Bervell (2019), habit can play a crucial role in determining actual use behavior.

As noted above, habit can directly influence human behavior and is likely to weaken the influence of behavioral intention (Kumar & Bervell, 2019; Limayem et al., 2007). In other words, developing a habit of using a particular system eliminates users' intention formation to use it, as they are very likely to use it without considering whether or not to use it (Kumar & Bervell, 2019) and "the stronger the habit, the lesser the prognostic power of the intention on the actual behavior" (Limayem et al., 2007, p. 730). Furthermore, Douskos (2017) explained the relations between habitual acts and mental processes, arguing that the notion of habit can explain aspects of human behavior that cannot be attributed to the idea of intention. Venkatesh et al. (2012) reported that previous work revealed that "habit has a direct effect on technology use and/or habit weakens or limits the strength of the relationship between behavioral intention and technology use" (p. 158). In

sum, the current study found that habit was the most powerful predictor of EFL learners' actual use of mobile devices in language learning, highlighting the significant role it plays in determining their acceptance of mobile learning platforms.

According to the findings, neither of the moderating variables (gender and experience) had any moderating effect on factor relationships. This is in agreement with Ameri et al. (2020) and Nikolopoulou et al. (2020).

From a theoretical perspective, this study contributes to the literature on mobile learning acceptance and use in general and MALL in particular. This study examined the UTAUT2 model in the context of MALL, as encouraged by Venkatesh et al. (2012), to validate the model and test its applicability. To the best of the author's knowledge, the current study is one of the few to employ the original version of UTAUT2 in the context of MALL in an EFL setting.

Examining UTAUT2 in a new context has provided additional evidence that the construct of effort expectancy does not influence the construct of behavioral intention. Since this lack of impact has overwhelmingly been confirmed in previous literature (e.g., Altalhi, 2021; Ameri et al., 2020; Arain et al., 2019; Botero et al., 2018; Hoi, 2020; Kumar & Bervell, 2019; Nikolopoulou et al., 2020), this construct should not be considered in this model as a predictor of behavioral intention to use technology.

In this study, habit was not only a critical predictor of behavioral intention but was also the only predictor of actual use behavior, emphasizing the need to consider habit in technology acceptance studies and as a construct in UTAUT2. Furthermore, including habit as a predictor of actual use canceled out behavioral intention's influence on actual use. A similar conclusion was reached by Kumar and Bervell (2019) but not by Ameri et al. (2020) or Nikolopoulou et al. (2020), in which both behavioral intention and habit were found to be powerful predictors of actual use behavior. This inconsistency suggests the need to empirically examine the influence of both constructs on actual use behavior in various contexts with various technologies.

From a practical perspective, this study empirically showed how UTAUT2 could enhance the current understanding of the aspects effecting EFL learners' acceptance of mobile learning technology. Based on these findings and the literature, various external and internal factors can impact learners' use of mobile learning in language learning; therefore, learners' use and acceptance of a given mobile learning platform should be examined as thoroughly as possible to reach valid and reliable results. Furthermore, practitioners and decision-makers should consider the effective factors reported in the literature to promote the acceptance and continuous use of mobile learning.

7. Limitations

This work had a number of limitations that should be noted. First, as the population of the study was a sample of Saudi first-year undergraduate EFL students learning English for academic purposes at a Saudi university, generalizability was limited. Second, in terms of age, the sample was homogeneous, ranging from 18 to 20 with an average of 19. Therefore, the findings might not apply to different age groups, which could be included in a future study. Third, the data were collected through a close-ended quantitative self-reported questionnaire; therefore, further research might use both qualitative and quantitative instruments to achieve a more holistic understanding of the acceptance and use of mobile learning in general and MALL in particular. Finally, the high rate of mobile device ownership in Saudi Arabia could restrict the generalizability of the findings to other countries with lower rates of mobile device ownership.

8. Conclusion

The educational effectiveness of mobile learning depends heavily on the perceptions and preferences of learners (Al-Adwan et al., 2018; Lai & Zheng, 2018; Luo & Watts, 2022; Puebla et al., 2022; Teo et al., 2019). Thus, understanding learners' acceptance of such technology should be seen as a cornerstone of successfully implementing mobile learning. The present study employed UTAUT2 to examine the use and acceptance of MALL among undergraduate EFL learners in Saudi Arabia and to theoretically contribute to the literature of mobile learning and technology acceptance.

The findings revealed that EFL learners' behavioral intention to use MALL was impacted significantly by habit, performance expectancy, facilitating conditions, hedonic motivation, and social influence, while effort expectancy and price value had no apparent impact. Out of behavioral intention, facilitating conditions, and habit, habit was the only construct found to have an impact on actual use behavior. The moderating variables hypothesized in this study (gender and experience) showed no significant moderating influence on relationships between constructs.

Finally, this study contributes to the literature on MALL and mobile learning in general, providing a reference for future mobile learning research using UTAUT2. The findings could inform both educational practitioners and the mobile learning industry by offering a deeper understanding of why EFL learners adopt mobile technology.

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References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Ajzen, I., & Fishbein, M. M. (1980). *Understanding attitudes and predicting social behavior*. Eaglewood Cliffs: Prentice-Hall.
- Al-Adwan, A. S., Al-Adwan, A., & Berger, H. (2018a). Solving the mystery of mobile learning adoption in higher education. *International*

- Journal of Mobile Communications*, 16(1), 24-49. <https://doi.org/10.1504/IJMC.2018.088271>
- Alhadiah, A. (2020). EFL learners' experience of a MALL-based vocabulary learning tool. *Indonesian Journal of Applied Linguistics*, 10(2), 283-291. <https://doi.org/10.17509/ijal.v10i2.28590>
- Altalhi, M. (2021). Toward a model for acceptance of MOOCs in higher education: the modified UTAUT model for Saudi Arabia. *Education and Information Technologies*, 26(2), 1589-1605. <https://doi.org/10.1007/s10639-020-10317-x>
- Althunibat, A. (2015). Determining the factors influencing students' intention to use m-learning in Jordan higher education. *Computers in Human Behavior*, 52, 65-71. <https://doi.org/10.1016/j.chb.2015.05.046>
- Ameri, A., Khajouei, R., Ameri, A., & Jahani, Y. (2020). Acceptance of a mobile-based educational application (LabSafety) by pharmacy students: An application of the UTAUT2 model. *Education and Information Technologies*, 25(1), 419-435. <https://doi.org/10.1007/s10639-019-09965-5>
- Andujar, A. (2016). Benefits of mobile instant messaging to develop ESL writing. *System*, 62, 63-76. <https://doi.org/10.1016/j.system.2016.07.004>
- Arain, A. A., Hussain, Z., Rizvi, W. H., & Vighio, M. S. (2019). Extending UTAUT2 toward acceptance of mobile learning in the context of higher education. *Universal Access in the Information Society*, 18(3), 659-673. <https://doi.org/10.1007/s10209-019-00685-8>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Eaglewood Cliffs: Prentice-Hall.
- Beres, D. L. (2011). Mobile-assisted language learning from the student perspective: Encouraging effective language learning strategies outside of the classroom. In *Academic podcasting and mobile assisted language learning: Applications and outcomes* (pp. 93-110). IGI Global. <https://doi.org/10.4018/978-1-60960-141-6.ch006>
- Botero, G. G., Questier, F., Cincinato, S., He, T., & Zhu, C. (2018). Acceptance and usage of mobile assisted language learning by higher education students. *Journal of Computing in Higher Education*, 30(3), 426-451. <https://doi.org/10.1007/s12528-018-9177-1>
- Burston, J., & Giannakou, K. (2021). MALL language learning outcomes: A comprehensive meta-analysis 1994–2019. *ReCALL*, 1-22. <https://doi.org/10.1017/S0958344021000240>
- Chuang, Y. T. (2017). MEMIS: A mobile-supported English-medium instruction system. *Telematics and Informatics*, 34(2), 640-656. <https://doi.org/10.1016/j.tele.2016.10.007>
- Chwo, G. S. M., Marek, M. W., & Wu, W. C. V. (2018). Meta-analysis of MALL research and design. *System*, 74, 62-72. <https://doi.org/10.1016/j.system.2018.02.009>
- Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education* (7th ed.). London: Routledge.
- Communications and Information Technology Commission. (2019). *Communications and information technology market: individuals and families survey*. Retrieved from <https://www.citc.gov.sa/ar/researchs-studies/studies/Pages/default.aspx>
- Daly, N. P. (2022). Investigating learner autonomy and vocabulary learning efficiency with MALL. *Language Learning & Technology*, 26(1), 1-30. <https://doi.org/10.125/73469>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 13(2), 319-340. <https://doi.org/10.2307/249008>
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace 1. *Journal of applied social psychology*, 22(14), 1111-1132. <https://doi.org/10.1111/j.1559-1816.1992.tb00945.x>
- Dodds, W. B., Monroe, K. B., & Grewal, D. (1991). Effects of price, brand, and store information on buyers' product evaluations. *Journal of marketing research*, 28(3), 307-319. <https://doi.org/10.1177%2F002224379102800305>
- Douskos, C. (2017). Habit and intention. *Philosophia*, 45(3), 1129-1148. <https://doi.org/10.1007/s11406-016-9810-z>
- Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers*, 21(3), 719-734. <https://doi.org/10.1007/s10796-017-9774-y>
- Dwivedi, Y. K., Rana, N. P., Tamilmani, K., & Raman, R. (2020). A meta-analysis based modified unified theory of acceptance and use of technology (meta-UTAUT): a review of emerging literature. *Current opinion in psychology*, 36, 13-18. <https://doi.org/10.1016/j.copsyc.2020.03.008>
- Dwivedi, Y. K., Shareef, M. A., Simintiras, A. C., Lal, B., & Weerakkody, V. (2016). A generalised adoption model for services: A cross-country comparison of mobile health (m-health). *Government Information Quarterly*, 33(1), 174-187. <https://doi.org/10.1016/j.giq.2015.06.003>
- El-Masri, M., & Tarhini, A. (2017). Factors affecting the adoption of e-learning systems in Qatar and USA: Extending the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). *Educational Technology Research and Development*, 65(3), 743-763. <https://doi.org/10.1007/s11423-016-9508-8>

- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading: Addison-Wesley Publication Company.
- Fithriani, R. (2021). The Utilization of mobile-assisted gamification for vocabulary learning: Its efficacy and perceived benefits. *Computer Assisted Language Learning Electronic Journal (CALL-EJ)*, 22(3), 146-163. Retrieved from <http://callej.org/journal/22-3/Fithriani2021.pdf>
- Fouz-González, J. (2020). Using apps for pronunciation training: An empirical evaluation of the English File Pronunciation app. *Language Learning & Technology*, 24(1), 62-85. <https://doi.org/10.125/44709>
- Gangaiamaran, R., & Pasupathi, M. (2017). Review on use of mobile apps for language learning. *International Journal of Applied Engineering Research*, 12(21), 11242-11251.
- Godwin-Jones, R. (2011). Mobile apps for language learning. *Language Learning & Technology*, 15(2), 2-11. Retrieved from <http://llt.msu.edu/issues/june2011/emerging.pdf>
- Godwin-Jones, R. (2017). Smartphones and language learning. *Language Learning & Technology*, 21(2), 3-17.
- Gupta, A., Yousaf, A., & Mishra, A. (2020). How pre-adoption expectancies shape post-adoption continuance intentions: An extended expectation-confirmation model. *International Journal of Information Management*, 52, 102094. <https://doi.org/10.1016/j.ijinfomgt.2020.102094>
- Hair, J., & Alamer, A. (2022). Partial least squares structural equation modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. *Research Methods in Applied Linguistics*, 1(3). <https://doi.org/10.1016/j.rmal.2022.100027>
- Hair, J., Black, W., Babin, B., & Anderson, R. (2019). *Multivariate data analysis* (8th ed.). Cengage.
- Hair, J., Hult, G., Ringle, C., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). SAGE Publications.
- Hao, S., Dennen, V. P., & Mei, L. (2017). Influential factors for mobile learning acceptance among Chinese users. *Educational Technology Research and Development*, 65(1), 101-123. <https://doi.org/10.1007/s11423-016-9465-2>
- Heil, C. R., Wu, J. S., Lee, J. J., & Schmidt, T. (2016). A review of mobile language learning applications: Trends, challenges, and opportunities. *The EuroCALL Review*, 24(2), 32-50. <https://doi.org/10.4995/eurocall.2016.6402>
- Hoang, D. T. N., Johnson, N. F., & McAlinden, M. (2022). Students' Perceptions and Real-Life Use of Mobile Technologies in EFL Learning. *Computer Assisted Language Learning Electronic Journal (CALL-EJ)*, 23(3), 186-206. Retrieved from <http://callej.org/journal/23-3.html>
- Hoi, V. N. (2020). Understanding higher education learners' acceptance and use of mobile devices for language learning: A Rasch-based path modeling approach. *Computers & Education*, 146, 103761. <https://doi.org/10.1016/j.compedu.2019.103761>
- Honarzad, R., & Soyooof, A. (2023). Two Vocabulary Learning Tools Used by Iranian EFL Learners: Physical Flashcards versus a Mobile App. *Computer Assisted Language Learning Electronic Journal (CALL-EJ)*, 24(1), 159-177. Retrieved from <http://callej.org/journal/24-1.html>
- Hou, Z., & Aryadoust, V. (2021). A review of the methodological quality of quantitative mobile-assisted language learning research. *System*, 100, 102568. <https://doi.org/10.1016/j.system.2021.102568>
- Kaliisa, R., Palmer, E., & Miller, J. (2019). Mobile learning in higher education: A comparative analysis of developed and developing country contexts. *British Journal of Educational Technology*, 50(2), 546-561. <https://doi.org/10.1111/bjet.12583>
- Kara, N. (2022). The Effect of Serious Mobile Games on Student English Vocabulary Acquisition and Attitude Toward English. *International Journal of Computer-Assisted Language Learning and Teaching (IJCALLT)*, 12(1), 1-16. <http://doi.org/10.4018/IJCALLT.297203>
- Ke, F., & Hsu, Y. C. (2015). Mobile augmented-reality artifact creation as a component of mobile computer-supported collaborative learning. *The Internet and Higher Education*, 26, 33-41. <https://doi.org/10.1016/j.iheduc.2015.04.003>
- Kukulka-Hulme, A., Lee, H., & Norris, L. (2017). Mobile Learning Revolution. In *The Handbook of Technology and Second Language Teaching and Learning* (eds C.A. Chapelle and S. Sauro). <https://doi.org/10.1002/9781118914069.ch15>
- Kumar, J. A., & Bervell, B. (2019). Google Classroom for mobile learning in higher education: Modelling the initial perceptions of students. *Education and Information Technologies*, 24(2), 1793-1817. <https://doi.org/10.1007/s10639-018-09858-z>
- Lai, C., & Zheng, D. (2018). Self-directed use of mobile devices for language learning beyond the classroom. *ReCALL*, 30(3), 299-318. <https://doi.org/10.1017/S0958344017000258>
- Lai, C., Hu, X., & Lyu, B. (2018). Understanding the nature of learners' out-of-class language learning experience with technology. *Computer assisted language learning*, 31(1-2), 114-143. <https://doi.org/10.1080/09588221.2017.1391293>
- Le, V. H., & Nguyen, H. N. (2021). Mobile Phones' Video Recording Tool: A Solution to Freshmen's English-Speaking Anxiety.

- International Journal of Computer-Assisted Language Learning and Teaching (IJCALLT)*, 11(2), 16-32.
<http://doi.org/10.4018/IJCALLT.2021040102>
- Li, J., & Cummins, J. (2019). Effect of using texting on vocabulary instruction for English learners. *Language Learning & Technology*, 23(2), 43-64. <https://doi.org/10.125/44682>
- Li, Y., & Hafner, C. A. (2022). Mobile-assisted vocabulary learning: Investigating receptive and productive vocabulary knowledge of Chinese EFL learners. *ReCALL*, 34(1), 66-80. <https://doi.org/10.1017/S0958344021000161>
- Limayem, M., Hirt, S. G., & Cheung, C. M. (2007). How habit limits the predictive power of intention: The case of information systems continuance. *MIS quarterly*, 705-737. <https://doi.org/10.2307/25148817>
- Lin, S., Zimmer, J. C., & Lee, V. (2013). Podcasting acceptance on campus: The differing perspectives of teachers and students. *Computers & Education*, 68, 416-428. <https://doi.org/10.1016/j.compedu.2013.06.003>
- Loewen, S., Crowther, D., Isbell, D. R., Kim, K. M., Maloney, J., Miller, Z. F., & Rawal, H. (2019). Mobile-assisted language learning: A Duolingo case study. *ReCALL*, 31(3), 293-311. <https://doi.org/10.1017/S0958344019000065>
- Luo, Y., & Watts, M. (2022). Exploration of university students' lived experiences of using smartphones for English language learning. *Computer Assisted Language Learning*, 1-26. <https://doi.org/10.1080/09588221.2022.2052904>
- Morgana, V. (2019). A review of MALL: from categories to implementation. The case of Apple's iPad. *The EuroCALL Review*, 27(2), 1-12. <https://doi.org/10.4995/eurocall.2019.11024>
- Nikolopoulou, K., Gialamas, V., & Lavidas, K. (2020). Acceptance of mobile phone by university students for their studies: An investigation applying UTAUT2 model. *Education and Information Technologies*, 1-17. <https://doi.org/10.1007/s10639-020-10157-9>
- Puebla, C., Fievet, T., Tsopanidi, M., & Clahsen, H. (2022). Mobile-assisted language learning in older adults: Chances and challenges. *ReCALL*, 34(2), 169-184. <https://doi.org/10.1017/S0958344021000276>
- Rassaei, E. (2021). Implementing mobile-mediated dynamic assessment for teaching request forms to EFL learners. *Computer Assisted Language Learning*, 1-31. <https://doi.org/10.1080/09588221.2021.1912105>
- Ringle, C. M., Wende, S., & Becker, J. M. (2015). *SmartPLS 3 [Computer Software]*. Bönningstedt: SmartPLS. Retrieved from <https://www.smartpls.com/>
- Rockey, C., Tieg, J., & Fernández, J. (2020). Mobile Application Use in Technology- Enhanced DCTs. *CALICO Journal*, 37(1), 85-108. <https://doi.org/10.1558/cj.38773>
- Rogers, E. M. (1995). *Diffusion of innovations* (4th ed.). New York: The New York Free Press.
- Shaw, N., & Sergueeva, K. (2019). The non-monetary benefits of mobile commerce: Extending UTAUT2 with perceived value. *International Journal of Information Management*, 45, 44-55. <https://doi.org/10.1016/j.ijinfomgt.2018.10.024>
- Stanley, G. (2013). *Language learning with technology: Ideas for integrating technology in the classroom*. Cambridge University Press.
- Šumak, B., & Šorgo, A. (2016). The acceptance and use of interactive whiteboards among teachers: Differences in UTAUT determinants between pre-and post-adopters. *Computers in Human Behavior*, 64, 602-620. <https://doi.org/10.1016/j.chb.2016.07.037>
- Sun, Z., Lin, C. H., You, J., Shen, H. J., Qi, S., & Luo, L. (2017). Improving the English-speaking skills of young learners through mobile social networking. *Computer assisted language learning*, 30(3-4), 304-324. <https://doi.org/10.1080/09588221.2017.1308384>
- Tamilmani, K., Rana, N. P., Wamba, S. F., & Dwivedi, R. (2021). The extended Unified Theory of Acceptance and Use of Technology (UTAUT2): A systematic literature review and theory evaluation. *International Journal of Information Management*, 57, 102269. <https://doi.org/10.1016/j.ijinfomgt.2020.102269>
- Tan, P. J. B. (2013). Applying the UTAUT to understand factors affecting the use of English e-learning websites in Taiwan. *Sage Open*, 3(4), 1-12. <https://doi.org/10.1177/2158244013503837>
- Taylor, S., & Todd, P. (1995). Assessing IT usage: The role of prior experience. *MIS quarterly*, 561-570. <https://doi.org/10.2307/249633>
- Teo, T., Doleck, T., Bazelaïs, P., & Lemay, D. J. (2019). Exploring the drivers of technology acceptance: a study of Nepali school students. *Educational Technology Research and Development*, 67(2), 495-517. <https://doi.org/10.1007/s11423-019-09654-7>
- Thomas, T., Singh, L., & Gaffar, K. (2013). The utility of the UTAUT model in explaining mobile learning adoption in higher education in Guyana. *International Journal of Education and Development using ICT*, 9(3). <https://www.learntechlib.org/p/130274/>
- Tommerdahl, J. M., Dragonflame, C. S., & Olsen, A. A. (2022). A systematic review examining the efficacy of commercially available foreign language learning mobile apps. *Computer Assisted Language Learning*, 1-30. <https://doi.org/10.1080/09588221.2022.2035401>
- Tong, P., Yin, Z., & Tsung, L. (2022). Student engagement and authentic language use on WeChat for learning Chinese as a foreign language. *Computer Assisted Language Learning*, 1-32. <https://doi.org/10.1080/09588221.2022.2052906>
- Triandis, H. C. (1977). *Interpersonal behavior*. Monterey: Brooke Cole.

- van Lieshout, C., & Cardoso, W. (2022). Google Translate as a tool for self-directed language learning. *Language Learning & Technology*, 26(1), 1-19. Retrieved from <http://hdl.handle.net/10125/73460>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478. <https://doi.org/10.2307/30036540>
- Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly*, 157-178. <https://doi.org/10.2307/41410412>
- Venkatesh, V., Thong, J. Y., & Xu, X. (2016). Unified theory of acceptance and use of technology: A synthesis and the road ahead. *Journal of the association for Information Systems*, 17(5), 328-376. Retrieved from <https://ssrn.com/abstract=2800121>
- Wang, W., & Jiang, L. (2021). Writing on WeChat moments: impact on writing performance and learner autonomy. *Computer Assisted Language Learning*, 1-29.
- Zhang, D., & Pérez-Paredes, P. (2019). Chinese postgraduate EFL learners' self-directed use of mobile English learning resources. *Computer Assisted Language Learning*, 1-26. <https://doi.org/10.1080/09588221.2019.1662455>

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